

# Work Order ID 55130

January 6, 2010 3:48:21 PM

Page 1

Item ID: D412-664-203

Accept

Setup Start

Revision ID:

Stop

Item Name: Crosstube Aft

Start Date: 07/01/2010 Start Qty: 1.00

Cust Item ID:

Required Date: 28/01/2010 Req'd Qty: 1.00

Customer:

Reference:

Run Start

Approvals:

Process Plan:

Date: 10-1-06

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr

Revision Nbr

D412-664-243

E

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D412-664-203 CHG 006

S. 10/2/03

MF 10/02/03

110

0.00



Packaging

Packaging

Memo

0.00

Packaging

UB 10-1-19

120

0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D412-664-243 using CNC bender program 412-af and Folio FT010

DP

10-1-19

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

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Item Name: Crosstube Aft

Start Date: 07/01/2010 Start Qty: 1.00

Cust Item ID:

Required Date: 28/01/2010 Req'd Qty: 1.00

Customer:

Reference:

Run Start



Approvals:

Process Plan:

Date:

Tooling:

Date:

Stop



QC:

Date:

SPC (Y/N):

Date:

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130  QC Quality Control	QC15- Crosstube Dimensional Check  Memo	0.00 2) 8 10 10 1 1 9 0.00				(X)			
140  Crosstubes Crosstubes	Crosstubes  Memo 1-Drill pilot holes in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551 2-Ream hole to finish size in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551. Check dimensions between holes, both sides on both cuffs, to ensure alignment wi	0.00 0.00				(X) (Q)		MB 10-01-20	
150  HandFXtube Hand Finishing Crosstubes	Crosstubes Chemical Conversion  Memo	0.00 0.00				(X) (Q)		MB 10-01-20	

W/O:		WORK ORDER CHANGES					
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**Work Order ID 55130**

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Revision ID:

Stop



Item Name: Crosstube Aft

Start Date: 07/01/2010 Start Qty: 1.00



Cust Item #:

Required Date: 28/01/2010 Retl Qty: 1.00



Customer:

Reference:

Run Start



Approvals:

Process Plan:

Date:

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
160 	QC3- Inspect Part Finish	0.00							
QC Quality Control	Memo	0.00	27 S10601/21						
170 	QC5- Inspect part completeness to step on W/O	0.00							
QC Quality Control	Memo	0.00	27 S10601/21			(X)			
180 	Outsource process - NDT per QSI038 4.1	0.00							
Outsource2 Outsource process - NDT	Memo Liquid Penetrant Inspection as per QSI 038 Or <input type="checkbox"/> Issue P/O: 11190 LPI as per ASTM 1417 <input type="checkbox"/> Level 2 Attach copy of NDT results to work order	0.00						PS 10-1-21 ①	

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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**NOTE:** Date & initial all entries

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Revision ID:

Stop



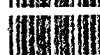
Item Name: Crosstube Aft

Start Date: 07/01/10 Start Qty: 1.00



Cust Item ID:

Required Date: 28/01/10 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Stop



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	----------------	--------------	--------------	---------------	---------------	------------------	----------------

190

0.00



Packaging

Packaging

Memo

0.00

Packaging

Inspect for transit damage ☐ Ensure copy of NDT results attached to work order.

*PC 140 1/21 (1)*

200

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

Inspect for damage & ensure results are as per Dwg D412-664-203

*ml 10 01 25 (1)*

210

0.00



SprayPaint

SprayPaint

Memo

0.00

Spray Painting

1-Prime inside and outside crosstube as per QSI 005 4.2 12-Paint outside crosstube with White Inuron as per QSI 005 4.2 ☐ PRIME ☐ Start  
Time: 8:00 ☐ Finish Time: 8:30 ☐ PAINT ☐ Start  
Time: 12:30 ☐ Finish Time: 1:30

*ml 10 01 29 (1)*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Customer:




Reference:

Run Start

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Stop

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
220  QC Quality Control	QC14- Inspect Spray Paint  Memo Then, Wrap in plastic bag to protect from scratches	0.00  0.00							PT 10-02-01
230  Crosstubes Crosstubes	Crosstubes  Memo Assemble as per Dwg D412-664-203 <input type="checkbox"/> 1- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe <input type="checkbox"/> 2-Install supports with magnobond as per QSI 015 Adhere for for 12 Hrs <input type="checkbox"/> A/R 6398 Magnobond Ba 112417 Exp 01/0011 Torque: m 15/02/02	0.00  0.00							M 10 02 01 (1)
240  QC Quality Control	QC5- Inspect part completeness to step on W/O  Memo	0.00  0.00							(H)

2) 81062102

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Cust Item ID:

Required Date: 28/01/2010 Req'd Qty: 1.00

Customer:

Reference:

Run Start



Approvals:

Process Plan:

Date:

Tooling:

Date:

Stop



QC:

Date:

SPC (Y/N):

Date:

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
250	Pick Kit	0.00							
Packaging	Memo	0.00							
Packaging									
260	QC4- 100% Inspect kits for completeness	0.00							
QC	Memo	0.00							
Quality Control									
270	Packaging	0.00							
Packaging	Memo	0.00							
Packaging	Identify and pack for shipping as per PPP D412-664-203 *****Ensure tube is not packaged if curing time is less than 12 hrs, see step 27 for application time & date ***** Type & date of packaging: <u>Feb 3rd 2010 @ 12:30pm</u> Location: _____								

10-2-3 sf @

Scolabel

10-2-3 sf

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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**Work Order ID 55130**

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Item Name: Crosstube Aft

Start Date: 07/01/2010 Start Qty: 1.00

Required Date: 28/01/2010 Req'd Qty: 1.00



Cust Item ID:

Customer:

Reference:

Run Start



Approvals:

Process Plan:

Date:

Tooling:

Date:

Stop



QC:

Date:

SPC (Y/N):

Date:

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run HoursDraw  
NumberDraw  
Rev.Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

280

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

10/02/04

mf

10-02-03

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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**NOTE:** Date & initial all entries

# Picklist Print

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Page 1

Work Order ID: 55130

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft


Comments:

Start Date: 07/01/2010


Required Date: 28/01/2010

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
AN6-40A  Bolt		Purchased	No			Each	134.0000	4.0000		10-2-3	SL

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
<u>Location</u>		
Main Warehouse		
ST	134	
112612	1	
112679	33	
112828	50	
113422	50	

AN6-41A  
  
Bolt

Purchased No

Each 106.0000 2.0000

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
<u>Location</u>		
Main Warehouse		
ST	106	
111605	11	
112489	20	
112805	25	
113288	50	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Work Order ID: 55130

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft

Comments:

Start Date: 07/01/2010

Required Date: 28/01/2010

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	--------------------------	---------------	----------------	--------

AN960JD616

Purchased

No

Each

669.0000

18.0000

Washer

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

669

112314

3

112828

366

113149

300

D2856-600

Manufactured

No

f

449.9974

1.7600

Abrasion Strip

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

449.9974

24328

6.73

25656

87.77

26650

8.23

36398

132.2074

37668

215.06

10-2-3 SP

10-2-3

ml 10/02/01

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Shop Packet Print

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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Work Order ID: 55130

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft

Start Date: 07/01/2010

Required Date: 28/01/2010

Start Qty: 1.00

Required Qty: 1.00

Comments:

Component Item Name	ID/	Replacement Item ID	Mfg/ Purch	Biz Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
---------------------	-----	---------------------	------------	----------	------------------	---------------	--------------	-----------------	-------------	-----------------------	------------	-------------	--------

D2896-1

Manufactured

No

Each

30.0000

1.0000



Support

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

30

43209

10

47820

20

Each

29.0000

2.0000

*MW* 10/02/01

D3189-1

Manufactured

No



Chafing Shield

Warehouse

Loc Qty

Loc Code

Location

OFFSHORE

FG

4

36065

4

Main Warehouse

ST

25

47777

5

52446

20

*MW* 10/02/01

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Parent Item Name: Crosstube Aft

Start Date: 07/01/2010

Required Date: 28/01/2010

Start Qty: 1.00

Required Qty: 1.00

Comments:

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
D3595-063-570		Manufactured	No				Each	69.0000	4.0000			
RUBBER CUSHION												

Warehouse	Loc Qty	Loc Code
Location		
OFFSHORE		
FG	4	
37971	4	
Main Warehouse		
ST	65	
42243	5	
45509	60	

MB 10/02/01

D412-664-203TRN

Manufactured No



Crosstube Turning Detail

Warehouse	Loc Qty	Loc Code
Location		
Main Warehouse		
FG	2	
54147	1	
54148	1	

MB 10-01-18 ✓

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Parent Item Name: Crosstube Aft

Comments:

Start Date: 07/01/2010

Required Date: 28/01/2010

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
MS21042L6		Purchased	No			Each	484.0000	6.0000			



Nut

10-2-3 sl

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
<u>Location</u>		
Main Warehouse		
ST	484	
105077	22	
110002	5	
111548	8	
111578	400	6
112492	49	

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Comments:

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Required Date: 28/01/2010

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Qty/ Unit	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Q on H d	Remaining Qty To Pick	Qty Issued	Date Issued	Status
MS21920-28		Purchased	No				Each	138.0000	4.0000			



Clamp(per MIL-DTL-8783C)

Warehouse	Loc Qty	Loc Code
<u>Location</u>		
OFFSHORE		
FG	5	
105884	5	
Main Warehouse		
ST	133	
106864	5	
108466	9	
108847	7	
109181	14	
109965	2	
111281	2	
111734	6	
112624	38	
112863	50	

*MW 10/02/01*

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Parent Item Name: Crosstube Aft

Start Date: 07/01/2010

Required Date: 28/01/2010

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
MS21920-30		Purchased	No				Each	147.0000	2.0000			
clamp(per MIL-DTL-8783C)												

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
<u>Location</u>		
Main Warehouse		
ST	147	
107600	3	
<u>109181</u>	44	
111258	50	
112772	50	

*MM 10/02/01*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

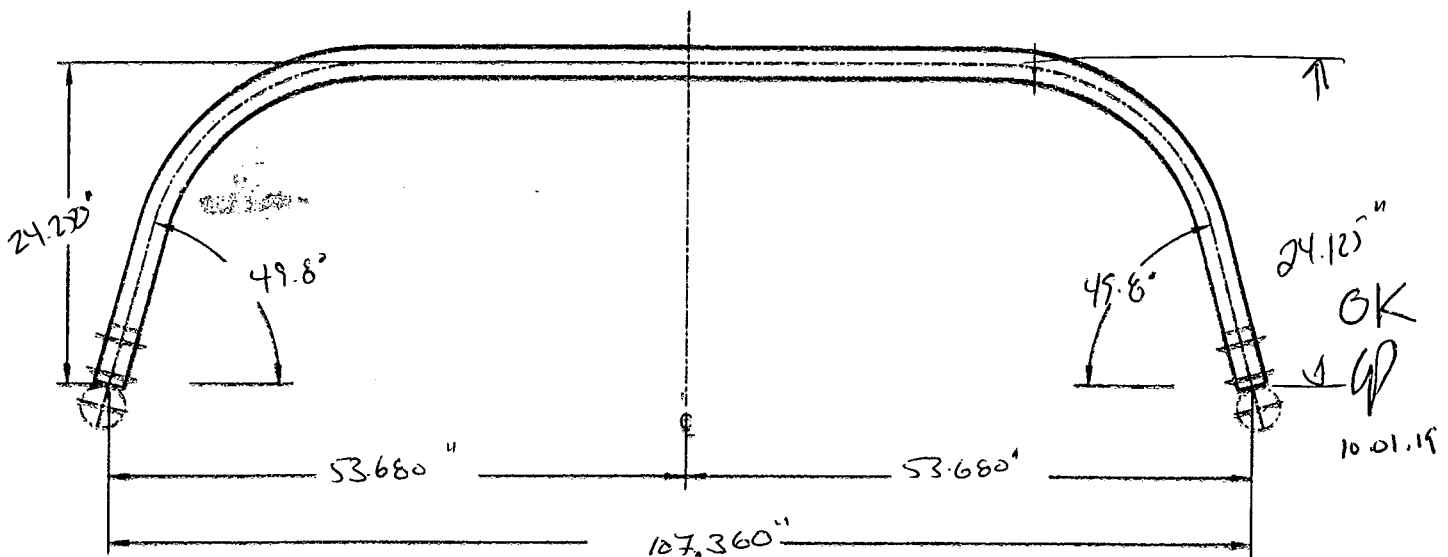
NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

DART AEROSPACE LTD		Work Order:	55130
Description: Crosstube High Aft (412)		Part Number:	D412-664-203
Inspection Dwg: D412-664-243		Rev: <del>D</del> E	Page 1 of 1

E 10.01.19

Required Dimension	Min	Max
Height	24.24	24.60
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.70



Comments
Tube is bent low, acceptable 10.01.19

QC15 Inspection	E
Date	10.01.19

Rev	Date	Change	Revised by	Approved
A	07.05.08	New Issue	KJ/JM	
B	07.06.08	Dimensions updated per Dwg rev. D	KJ/JLM	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

Item	Qty	Part Number	Description
	-243		
1	X	D412-664-243	CROSSTUBE ASSEMBLY (#12 HIGH A)
2	1	D6009-129	CROSSTUBE
3	2	D3595-063-570	RUBBER CUSHION
4	1	D2896-1	SUPPORT
5	2	D3189-1	CHAFING SHIELD
6	2	D2856-600-1009	ABRASION STRIP
7	4	MS21920-28	CLAMP
8	2	MS21920-30	CLAMP (OR MS21920-32)
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION R80-120-023 ADHESIVE (TEXTRON/BELL SPEC. 289-947-100, TYPE II, CLASS 2 ADHESIVE)

# **GENERAL NOTES:**

- 1) MATERIAL: MANUFACTURED FROM D6009-129  
FINISHED LENGTH = 124.100±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D412-664-243" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 47.0 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2896-1 SUPPORT USING 0.05" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE THE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.15 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 15) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 16) TORQUE CLAMPS 80 TO 100 IN.-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP CC  
RETURN  
ENGINEER  
UNCONTROLLED  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 55180  
B-10-1-06

**RELEASED**  
1 200-10-28  
JMD

E	REFORMAT/REVISE GENERAL NOTES; REORGANIZED NOTES AND REFORMATTED DRAWING TO CURRENT STANDARDS; RELOCATED FLAG #5 PER PAR 06-046 (ZIN 46-5); ADD TOLERANCE (ZIN 56-3, C4-2, C8-3 & C5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	09.09.30
D	REMOVE D2732-028, CHANGE TO D3595-063-570	PSH	07.03.29
C	REMOVE D2896-600-1009, ADD D2732-059 & MAGNOBOND 6398, MS21920-32 WAS MS21920-30	MS	06.13.27
B	ADD HOLES FOR COMPATIBILITY WITH B7E JAA SKIDUSCS	PSH	05.02.04
A	NEW ISSUE	PSH	01.10.17
REV.	DESCRIPTION	BY	DATE
DESIGN	<u>B</u>	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA DRAWING NO. <u>D412-664-243</u> REV. <u>E</u> SHEET 1 OF 4 TITLE <u>CROSSTUBE ASSEMBLY (#12 HZ AFT)</u> NTS COPYRIGHT © 2000, DART AEROSPACE LTD ALL RIGHTS RESERVED. NO PART OF THIS PUBLICATION MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS WITHOUT PERMISSION IN WRITING FROM DART AEROSPACE LTD.	
DRAWN	<u>RF</u>		
CHECKED	<u>P</u>		
MFG. APPR.	<u>B</u>		
APPROVED	<u>12</u>		
DE APPR.	<u>A</u>	DATE <u>09.09.30</u>	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

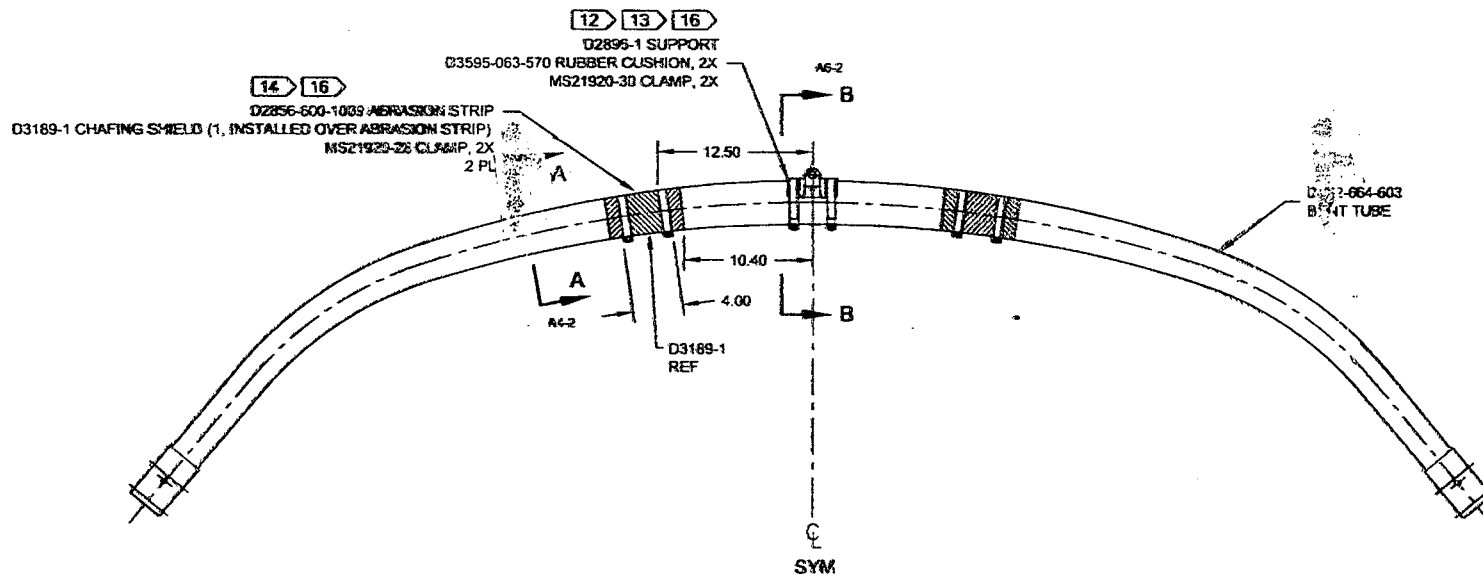
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

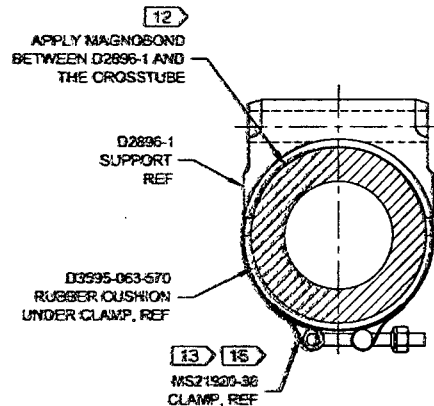
NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

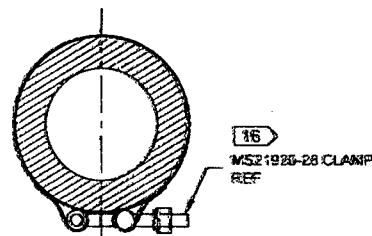




**D212-664-243**  
**ASSEMBLY DETAIL**



**SECTION B-B** D4-2  
SCALE 4X



**SECTION A-A** C6-2  
SCALE 4X

**RELEASED**  
2009-10-29  
NKK

W/O 53730

DESIGN	PH	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	Q	DRAWING NO.	REV. E
MFG. APPR.	DS	D412-664-243	SHEET 2 OF 4
APPROVED	14	TITLE	SCALE
DE APPR.	14	CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DATE	09.09.30	COPYRIGHT © 2007 DART AEROSPACE LTD THIS DOCUMENT IS UNCLASSIFIED AND IS RELEASED IN THE PUBLIC DOMAIN. IT IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM.	

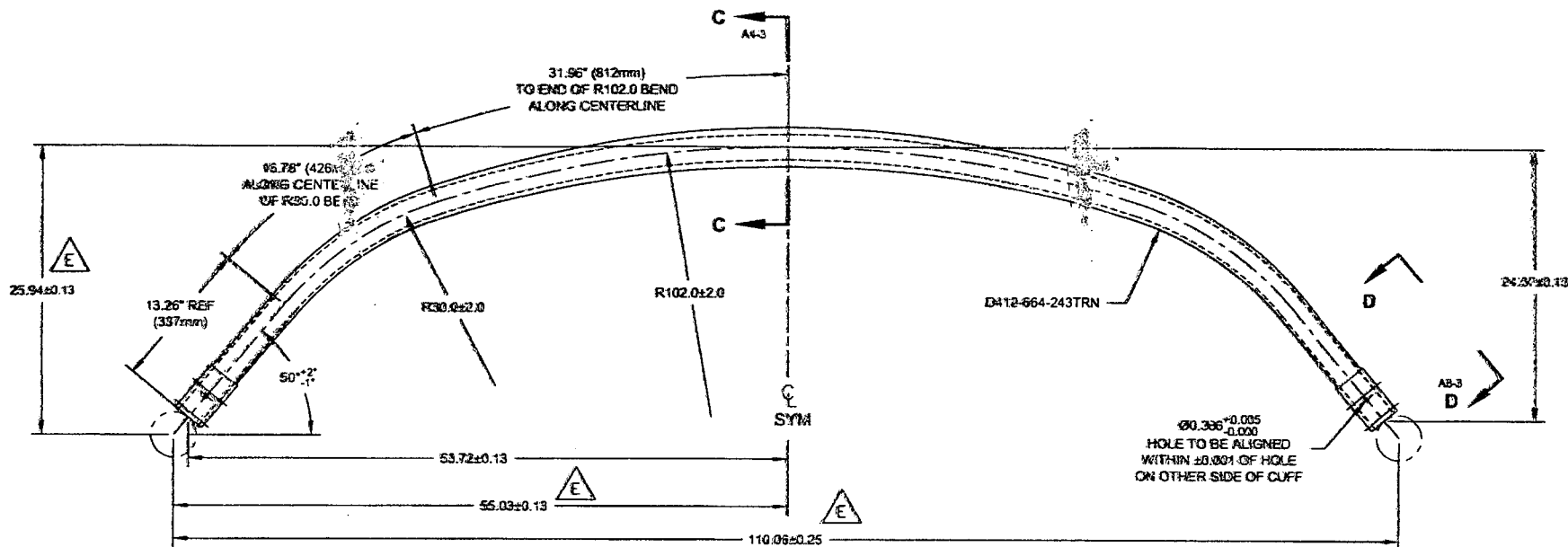
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

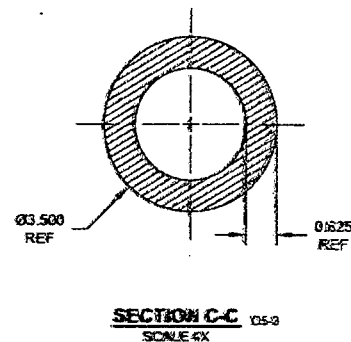
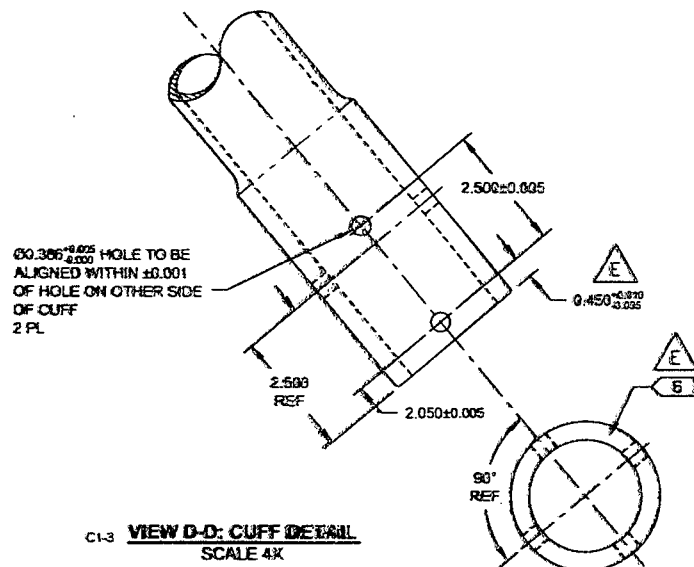
Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



**D412-664-603**  
**BENDING AND DRILLING DETAIL**



**RELEASED**  
2008-10-28  
MP

W/D 35130

DESIGN	PH	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF	DRAWING NO.	REV. E
CHECKED	PH	D412-664-243	SHEET 3 OF 4
MFG. APPR.	PH	TITLE	SCALE
APPROVED	PH	CROSSTUBE ASSEMBLY (412-111AFT)	UNITS
DE APPR.	PH	COPYRIGHT © 2001 BY DART AEROSPACE LTD REPRODUCTION BY ANY MEANS WITHOUT PERMISSION IS PROHIBITED	
DATE	09.09.30		

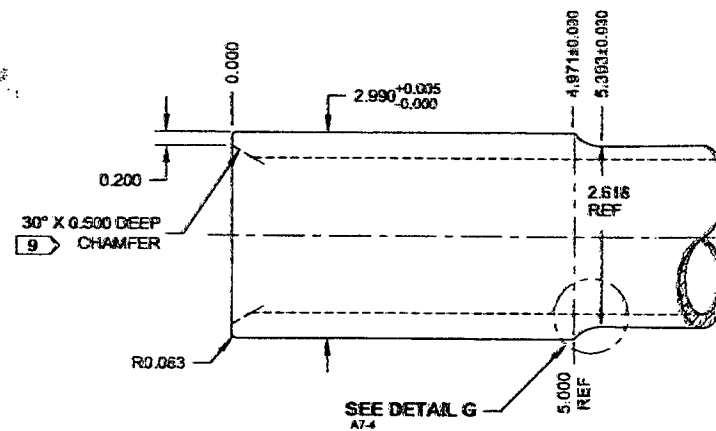
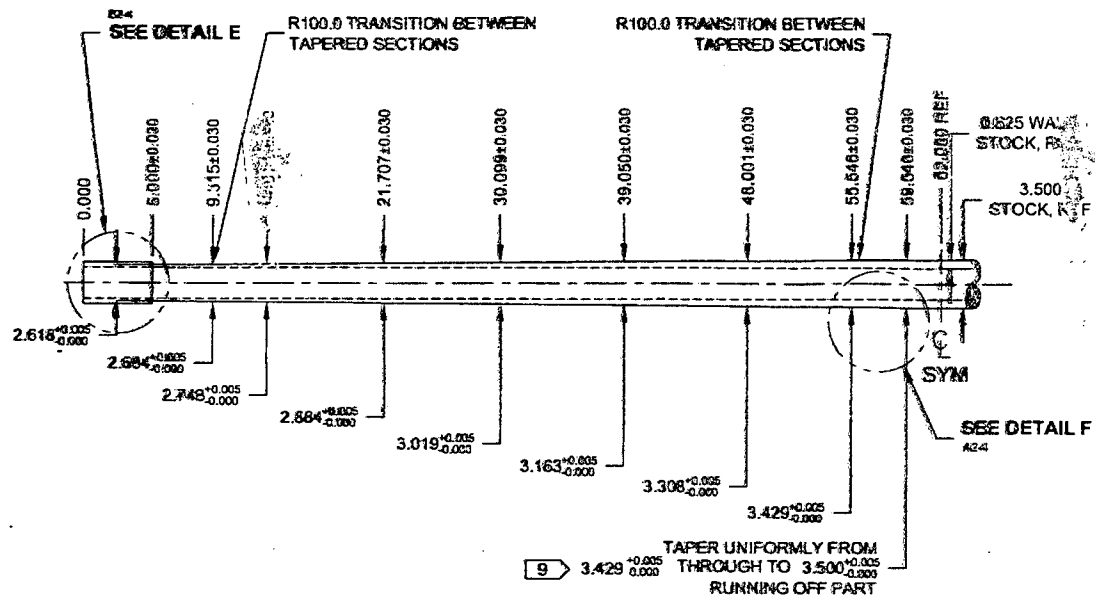
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

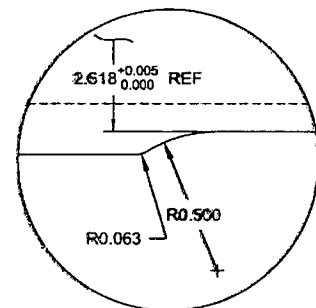
NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

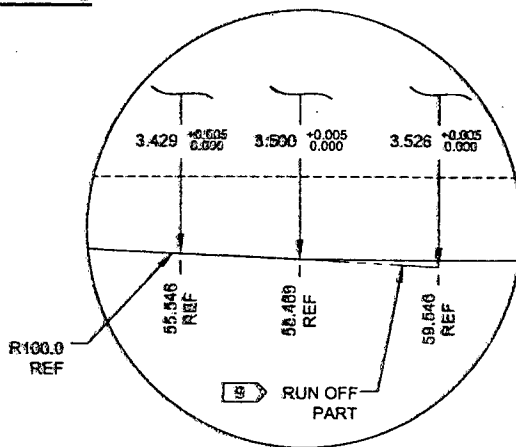


DETAIL E:  
CROSSTUBE CUFF D6-4  
SCALE 5X

D412-664-243TRN  
TURNING DETAIL



DETAIL G:  
CUFF TRANSITION C1-4  
SCALE 10X



DETAIL F:  
TAPER RUN-OFF C4-4  
NOT TO SCALE

RELEASED  
2005-10-29  
NR

WLO 55130

DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAMMERSBURY, ONTARIO, CANADA	
CHECKED	RP	DRAWING NO.	REV. E
MFG. APPR.	DS	D412-664-243	SHEET 4 OF 4
APPROVED	NO	TITLE	SCALE
DE APPR.	HT	CROSSTUBE ASSEMBLY (M12 M11 MFT)	NTS
DATE	09.09.30	COPYRIGHT © 2001 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED UNDER THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS WITHOUT THE WRITTEN PERMISSION OF DART AEROSPACE LTD.	

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



# LIQUID PENETRANT TEST REPORT

P- 15315

PAGE 1 OF 1

CLIENT DART NEWSpace DATE JANUARY 21-2010 TIME AM ☒ PM ☐  
ATTENTION LINDA / CHAN TEL ACUREN JOB NO. 188-10-0046  
ADDRESS 1270 ASH JEN ST PO/WO NO. 11190  
HAWKESBURY C.D. K6H 1K7 WORK LOCATION SHOP  
ACCEPTANCE STD. ASTM 1917 REV./DATE 2007  
PROJECT F.P.I. ON 2 CROSS TUBES, 12  
ITEM(S) EXAMINED MACHINED PARTS

JOB DESCRIPTION PROCEDURE No. LT-0002 REV./DATE TECHNIQUE No. LT-TECH 2 REV./DATE  
PART NO. STAINLESS STEEL MATERIAL AUDINE ALUMINUM THICKNESS  
SCOPE WET FLOW ESCENT LIQUID PENETRANT  
INSPECTION CARRIED OUT 100% EXTERNAL

## TEST DETAILS

METHOD <input checked="" type="checkbox"/> FLUORESCENT <input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH <input type="checkbox"/> SOLVENT REMOVABLE <input type="checkbox"/> POST EMULSIFIED
FAMILY BRAND <u>MACROFLUX</u>	BLACK LIGHT S/N <u>16457</u> <input type="checkbox"/> OUTPUT > 1000 $\mu$ W/cm <sup>2</sup> <input type="checkbox"/> AMBIENT < 2 fc
PENETRANT <u>ZL 67</u> MINIMUM DWELL TIME <u>1045</u> MIN.	LIGHTING EQUIP. <input type="checkbox"/> FLASHLIGHT <input type="checkbox"/> TROUBLELIGHT <input type="checkbox"/> OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER <u>H2O</u> MINIMUM DRY TIME <u>&gt;10</u> MIN.	OTHER <u>L1S.20</u>
DEVELOPER <u>SKD 52</u> MINIMUM DWELL TIME <u>10</u> MIN.	LIGHT METER S/N <u>1098866</u> CAL DUE DATE <u>10-1-23</u>
DEVELOPER TYPE <input checked="" type="checkbox"/> NON AQUEOUS <input type="checkbox"/> AQUEOUS <input type="checkbox"/> DRY	

## TEST SURFACE

SURFACE CONDITION <input type="checkbox"/> AS GROUND <input type="checkbox"/> AS WELDED <input checked="" type="checkbox"/> MACHINED <input type="checkbox"/> SHOT BLASTED <input type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE <input type="checkbox"/> < -4°C/ 20°F <input type="checkbox"/> -4°C/ 20°F TO 10°C/ 50°F <input checked="" type="checkbox"/> 10°C/ 50°F TO 52°C/ 125°F <input type="checkbox"/> > 52°C/ 125°F

## RESULTS- ☐ METRIC ☐ IMPERIAL

12 STDS, -W.O. 54859 ✓

1 CROSS TUBE, W.O. 55130 ✓

1 CROSS TUBE, W.O. 55131 ✓

ALL ITEMS HAVE BEEN FOUND  
ACCEPTABLE TO STANDARD.  
IN THIS REPORT.

*[Signature]* 10/01/25

## Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

## Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

## SIGNATURES

CLIENT REPRESENTATIVE <u>MATTHEW MURDOCH</u> <i>[Signature]</i> DTR # <u>E-27676</u>	REPORT REVIEWED BY:
TECHNICIAN (SIGNATURE): <u>W.KE JEFFERSON</u> <i>[Signature]</i>	NAME INITIALS
NAME (PRINT): <u>W.KE JEFFERSON</u>	
CGSB LEVEL <u>1</u> SNT LEVEL <u>II</u> CGSB LEVEL <u>2</u> SNT LEVEL <u></u>	
CGSB REG. No <u>6666</u> CGSB REG. No <u></u>	



E-27696

Form dated Sep 2005

Date: JAN 24 - 21 - 2010  
 Wed Thurs Fri Sat  
 W.O #: 188 - 10 - 0646  
 Camera #: —

[illegible]

RADIOGRAPHIC UNIT PRICING																				
Weld Diameter										Long Seam						Circ. Seam				
Schedule / Thickness										Thickness						Thickness				
Quantity										Lineal Ft.						Lineal Ft.				

Consumables: \_\_\_\_\_

Equipment: \_\_\_\_\_

Client Representative: Matthew Murphy

Place a check mark in each safety check area as completed	
C/C	CAMERA CHECK
S/E	SAFETY EQUIPMENT CHECK
S/C	SURVEY METER CHECK
B/S	BARRIER & SIGN INSTALLED
C/L	CAMERA LOCKED & SECURELY STORED
C/S	CAMERA SURVEYED AFTER EACH USE

EXPENSES
NOTES

**ACUREN 1-877-299-2857**

<b>Oakville</b>	(905) 825-8595 • Fax (905) 825-8598
<b>Sarnia</b>	(519) 336-3021 • Fax: (519) 336-8220
<b>Sudbury</b>	(705) 522-1849 • Fax (705) 522-9926
<b>Halifax</b>	(902) 497-3870 • Fax (902) 445-5090
<b>North Bay</b>	(705) 840-8107 • Fax (705) 476-6683
<b>Val D'Or</b>	(819) 856-6789 • Fax (819) 825-9564

<b>Cambridge</b>	(519) 622-3112 • Fax (519) 622-1326
<b>Cornwall</b>	(613) 931-1261 • Fax (613) 931-2777
<b>Saint John</b>	(506) 847-0194 • Fax (506) 847-0194
<b>Thunder Bay</b>	(807) 475-4240 • Fax (807) 577-2017
<b>Gaspé</b>	(418) 392-3618 • Fax (418) 392-4114
<b>Hull</b>	(819) 360-0685 • Fax (819) 827-3513